

# CSE 237A Winter 2023: Individual Project Part 2

## Part 2 of 2: Sensor interaction and real-time scheduler

### Assignment

In this part, you will implement a program which interacts with the RPi4's sensors. The RPi4 provides multiple General Purpose Input/Output (GPIO) connectors, which carry signals to/from the sensors. You will connect the sensors to the RPi4, and implement a user space program using the WiringPi library for GPIO communications. The program you will create emulates a sensor platform that detects emergency situations in operating vehicles. Subsequently, you will use the base code that extends sensors with longer latencies, on which you will implement your energy efficient scheduler.

#### Complete the following steps:

1. Familiarize yourself with wiringPi: <http://wiringpi.com/>
2. Connect the sensors to the RPi4 and implement a user space program using the WiringPi library for GPIO communications. A skeleton code is available in the projects folder.
3. Update your sensor program to detect emergency situations in operating vehicles. Implement a list scheduler considering task priorities.
4. Implement an energy efficient scheduler that should manage the provided standard workload.

#### Submission:

1. Demo on 2/7/23: Submit a video recording of your sensor program with an unmodified version of the provided standard workload and actuation scenarios.
2. Submit these files:
  - a. Four source files: `sensor.h`, `sensor.c`, `assignment2.h`, and `assignment2.c`.
  - b. A report: `assignment2.pdf` describing your program and energy-efficient scheduler, and the estimated CPU energy consumption.

